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**Proceedings of the regional peer review of the recovery potential assessment of
Threeshorn Wartyback (*Obliquaria reflexa*) in Canada**

December 10, 2013

WebEx and Conference Call

Co-chairpersons: Lynn Bouvier and Todd Morris

Editor: Lynn Bouvier

Fisheries and Oceans Canada
Great Lakes Laboratory for Fisheries and Aquatic Sciences
867 Lakeshore Rd.
Burlington ON L7R 4A6 Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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[http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca](http://www.dfo-mpo.gc.ca/csas-sccs/csas-sccs@dfo-mpo.gc.ca)



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SUMMARY

A regional science peer-review meeting was held on December 10, 2013 in Burlington, Ontario. The purpose of the meeting was to assess the recovery potential of Threehorn Wartyback (*Obliquaria reflexa*) based on the 27 steps outlined in the Fisheries and Oceans Canada (DFO) National Frameworks. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has designated Threehorn Wartyback as Threatened (May 2013). The mussel currently is not listed on the *Species at Risk Act* (SARA) or the Ontario *Endangered Species Act*, 2007. The Science Advisory Report resulting from this Recovery Potential Assessment (RPA) will provide the information and scientific advice to inform the SARA listing decision. If listed, this scientific advice will also be needed to fulfill SARA requirements, including the development of a recovery strategy, and to support decision-making with regards to SARA agreements and permits. Meeting participants included experts from DFO. This proceedings report summarizes the relevant discussions from the peer-review meeting and presents revisions to be made to the associated research document.

The Proceedings, Science Advisory Report and Research Document resulting from this science advisory meeting are published on the [DFO Canadian Science Advisory Secretariat \(CSAS\) website](#).

Compte rendu de l'évaluation du potentiel de rétablissement (ÉPR) à l'échelle régionale de l'obliquaire à trois cornes (*Obliquaria reflexa*)

SOMMAIRE

Une réunion régionale d'examen scientifique par les pairs s'est tenue le 10 décembre 2013 à Burlington, en Ontario. L'objectif de cette réunion était d'évaluer le potentiel de rétablissement de l'obliquaire à trois cornes (*Obliquaria reflexa*) d'après les 27 étapes présentées dans les cadres nationaux de Pêches et Océans Canada (MPO). Le Comité sur la situation des espèces en péril au Canada (COSEPAC) a désigné les obliquaires à trois cornes comme étant menacé (mai 2013). À l'heure actuelle, cette moule ne figure pas sur la liste de la *Loi sur les espèces en péril* (LEP) ou de la *Loi sur les espèces en voie de disparition* de l'Ontario. L'avis scientifique découlant de cette évaluation fournira les renseignements et les conseils scientifiques nécessaires pour éclairer la prise de décisions concernant l'inscription de cette espèce en vertu de la LEP. Si l'espèce est inscrite, cet avis scientifique sera également nécessaire afin de satisfaire aux exigences de la LEP, telles que l'élaboration d'un programme de rétablissement, et d'éclairer la prise de décisions concernant les ententes et les permis en lien avec la LEP. Les participants à la réunion étaient notamment des experts du MPO. Le présent compte rendu résume les discussions pertinentes de la réunion d'examen par les pairs et présente les modifications qui seront apportées aux documents de recherche connexes.

Le compte rendu, l'avis scientifique et le document de recherche qui découlent de la présente réunion de consultation scientifique sont publiés sur le [site web du Secrétariat canadien de consultation scientifique du MPO](#).

INTRODUCTION

In May 2013 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated Threehorn Wartyback as Threatened. This was the first time this species was assessed.

The reason for the assessment was as follows: "This rare species historically occurred in the Great Lakes drainages including Lake St. Clair, western Lake Erie, and the Grand, Thames, and Detroit rivers. The species has not been found since 1992 in Lake St. Clair and the Detroit River and may be extirpated there due largely to the impacts of Zebra and Quagga mussels. It was last recorded from the Canadian side of Lake Erie in 1997. Pollution (sediment loading, nutrient loading, contaminants and toxic substances) related to both urban and agricultural activities represents a high and continuing threat at the three remaining riverine locations."

Threehorn Wartyback is not listed on the *Species at Risk Act* (SARA) or the *Endangered Species Act*, 2007.

A peer-review meeting was held at the Canadian Centre for Inland Waters, Burlington, Ontario, on December 10, 2013. The purpose of the meeting, as described in the Terms of Reference (Appendix 1), was to assess the recovery potential of Threehorn Wartyback. The recovery potential assessment (RPA) is a science-based peer review process that assesses the current status of the species by addressing the 27 steps in the National Frameworks outlined in the Revised Protocol for Conducting Recovery Potential Assessments (DFO 2007). The current state of knowledge about habitat requirements, threats to both habitat and Threehorn Wartyback, and measures to mitigate these impacts are included in the Science Advisory Report.

The meeting participants were experts from DFO (Appendix 2).

This proceedings report summarizes the relevant discussions from the peer-review meeting and presents revisions to be made to the associated research documents. The Research Document (Bouvier et al. 2014) is the working paper presented at the workshop and provides the current understanding of the distribution and habitat requirements of this species, along with recovery targets and times to recovery, while considering various management scenarios.

DETAILED DISCUSSION

The meeting co-chairs provided the participants with a brief overview of the Science advisory process and the COSEWIC listing process. A draft RPA had been developed by DFO and provided to the participants for review in advance of the meeting. The participants' feedback was the basis for discussion; the group was invited to review the comments related to errors and omissions in the draft to ensure that the best, most accurate information was included.

Species Description

Presenter: Lynn Bouvier

It was noted that the text on the second page of the document included information on 62 lengths that were taken from the Grand River. This data had been given to the report author later in the writing process, and had not been included in size distribution [Figure 1 in Bouvier et al. (2014)]. The figure was revised accordingly.

The length at age relationship was originally based on the age interpretations of two agers. A third ager completed interpretations, providing additional data for the report and their results

were incorporated in the length at age estimates [Figure 3 in Bouvier et al. (2014)]. Figure 3 was revised based on the new information; the maximum age changed from 16 to 14.

A participant noted that, on page 2, the species was described as "moderately long-lived." This description had come from the COSEWIC report (COSEWIC 2013), which had been written before new data had become available. The group agreed that the document should be changed to describe Threehorn Wartyback as short-lived.

Current Status

Presenter: Lynn Bouvier

New information had been brought forward for the section on the Great Lakes and Connecting Channels: 13 Threehorn Wartyback had been observed in American sampling sites in 2013. A note on these samples would be added to the document for context only, and would not affect the assessment of the Canadian population status.

Habitat Requirements

Presenter: Lynn Bouvier

On page 12 of the document, under "Host Fishes," a participant suggested adding information about the presence of Mooneye (*Hiodon tergisus*) in areas where Threehorn Wartyback are known to occur. This suggestion was approved.

One reference was proposed for page 14 of the document (Metcalf-Smith et al. 1998). In this article the authors reported that one live individual had been caught at a maximum depth of five metres. The presenter asked the group whether or not they felt that depth should be included in Table 4 of the document, which would be used to help identify critical habitat. One participant did not agree with the change because the table was meant to identify essential habitat characteristics, and DFO did not have enough information about depth to characterize it as such. After some discussion around previous sampling, the group agreed to include the information in the text, but not the table.

An error was identified on page 7 of the document: it gave a number of three fresh shells collected from the Thames River instead of four. Another participant noted that DFO does not normally record fresh shell numbers when live individuals are present at a site. Because live individuals were present in this instance, the group decided to remove the reference to fresh shells altogether.

Returning to Table 4, the presenter explained that they originally had forgotten to add the point that gravid females have been observed in the Sydenham River in the month of June (Castanon pers. comm. in COSEWIC 2013). This information had been added under spawning and fertilization.

The presenter then asked the group if they felt that the presence of dreissenid mussels should be included in the table. The participants agreed that the information was useful, both in terms of understanding the habitat and demonstrating that lower numbers of dreissenid mussels can coexist with unionids. For the latter reason, habitats where dreissenids were present could still be listed as critical. The information on dreissenids had already been included in the draft, and so no changes were made to the document.

Threat Level Assessment

Presenter: Lynn Bouvier

The participants had reviewed the likelihood and impact of threats, as well as the certainty associated with threat impact. Threat likelihood (TLH) was categorized as "known" (K), "likely" (L), "unlikely" (U), or "unknown" (UK); threat impact (TI) was categorized as "high" (H), "medium" (M), "low" (L), or "unknown" (UK). The certainty associated with threat impact (C) was categorized as 1, or derived from causative studies; 2, or derived from correlative studies; or 3, or expert opinion.

In the assessment of the Sydenham River a participant had noted that high turbidity levels were thought to disrupt reproduction because Threehorn Wartyback uses conglutinates to attract the host fish. The presenter agreed with that point; however, they felt that the impact of the threat was up for discussion. It was originally listed as UK, but because Threehorn Wartyback uses visual predators as hosts, the group agreed that the TI of turbidity should be changed to M.

For altered flow regimes, the original document had listed the TLH as U. A participant had commented that one paper had reported a trend of decreasing peak flows in the Sydenham River and attributed it to the impact of climate change and dams (Parish 2000). The group felt that this observation alone did not warrant a change to the assessment.

In the overview of the Grand River, a participant had suggested changing the TI of nutrient loading from M to H based on information given in a newer report (MacDougall and Ryan 2012). That change was made to the document.

The information from the revised threat assessment tables would be put into the accompanying heat matrix. As the final threat assessment results are simply a result of the threat input tables, discussed at the meeting, the presenter told the participants that they would not need to review the final threat assessment before the document was published.

Mitigations and Alternatives

Presenter: Lynn Bouvier

Two additions were suggested for the host fish section: the removal of dams to allow host fish access and the artificial propagation of host species when warranted. In the first case, the group decided instead to use a phrase such as "enhance access of host fish." The group agreed to add the second suggestion as it was.

The meeting co-chair then reviewed the group's next steps, stating that they would modify the documents from the meeting in accordance with the participants' comments. The Science Advisory Report and the Proceedings Report would be published online, at which time the co-chair would send the participants the links.

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APPENDIX 1. TERMS OF REFERENCE

Recovery Potential Assessment of Threehorn Wartyback (*Obliquaria reflexa*) in Canada

Regional Peer Review Meeting – Central and Arctic Region

December 10, 2013

WebEx and Conference Call

Chairpersons: Lynn Bouvier and Todd Morris

Context

When the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designates aquatic species as threatened or endangered, Fisheries and Oceans Canada (DFO), as the responsible jurisdiction under the *Species at Risk Act* (SARA), is required to undertake a number of actions. Many of these actions require scientific information on the current status of Threehorn Wartyback, threats to its survival and recovery, and the feasibility of its recovery. Formulation of this scientific advice has typically been developed through a Recovery Potential Assessment (RPA) that is conducted shortly after the COSEWIC assessment. This timing allows for the consideration of peer-reviewed scientific analyses into SARA processes including recovery planning.

COSEWIC met in May 2013 and recommended that Threehorn Wartyback be designated Threatened (COSEWIC 2013). This was their first assessment of Threehorn Wartyback.

In support of listing recommendations for this species by the Minister, DFO Science has been asked to undertake an RPA, based on the National Frameworks (DFO 2007a and b). The advice in the RPA may be used to inform both scientific and socio-economic elements of the listing decision, as well as development of a recovery strategy and action plan, and to support decision-making with regards to the issuance of permits, agreements and related conditions, as per section 73, 74, 75, 77 and 78 of SARA. The advice generated via this process will also update and/or consolidate any existing advice regarding this species.

Objectives

To assess the recovery potential of Threehorn Wartyback (*Obliquaria reflexa*).

Assess current/recent species/ status

1. Evaluate present status for abundance and range and number of populations.
2. Evaluate recent species trajectory for abundance (i.e., numbers and biomass focusing on mature individuals) and range and number of populations.
3. Estimate, to the extent that information allows, the current or recent life-history parameters (total mortality, natural mortality, fecundity, maturity, recruitment, etc.) or reasonable surrogates; and associated uncertainties for all parameters.
4. Estimate expected population and distribution targets for recovery, according to DFO guidelines (DFO 2005, and 2011).

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5. Project expected population trajectories over three generations (or other biologically reasonable time), and trajectories over time to the recovery target (if possible to achieve), given current parameters for population dynamics and associated uncertainties using DFO guidelines on long-term projections (Shelton *et al.* 2007).
 6. Evaluate residence requirements for the species, if any.

Assess the Habitat Use

7. Provide functional descriptions (as defined in DFO 2007b) of the required properties of the aquatic habitat for successful completion of all life-history stages.
8. Provide information on the spatial extent of the areas that are likely to have these habitat properties.
9. Identify the activities most likely to threaten the habitat properties that give the sites their value, and provide information on the extent and consequences of these activities.
10. Quantify how the biological function(s) that specific habitat feature(s) provide to the species varies with the state or amount of the habitat, including carrying capacity limits, if any.
11. Quantify the presence and extent of spatial configuration constraints, if any, such as connectivity, barriers to access, etc.
12. Provide advice on how much habitat of various qualities / properties exists at present.
13. Provide advice on the degree to which supply of suitable habitat meets the demands of the species both at present, and when the species reaches biologically based recovery targets for abundance and range and number of populations.
14. Provide advice on feasibility of restoring habitat to higher values, if supply may not meet demand by the time recovery targets would be reached, in the context of all available options for achieving recovery targets for population size and range.
15. Provide advice on risks associated with habitat "allocation" decisions, if any options would be available at the time when specific areas are designated as critical habitat.
16. Provide advice on the extent to which various threats can alter the quality and/or quantity of habitat that is available.

Scope for Management to Facilitate Recovery

17. Assess the probability that the recovery targets can be achieved under current rates of parameters for population dynamics, and how that probability would vary with different mortality (especially lower) and productivity (especially higher) parameters.
18. Quantify to the extent possible the magnitude of each major potential source of mortality identified in the pre-COSEWIC assessment, the COSEWIC Status Report, information from DFO sectors, and other sources.
19. Quantify to the extent possible the likelihood that the current quantity and quality of habitat is sufficient to allow population increase, and would be sufficient to support a population that has reached its recovery targets.
20. Assess to the extent possible the magnitude by which current threats to habitats have reduced habitat quantity and quality.

Scenarios for Mitigation and Alternative to Activities

21. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all feasible measures to minimize/mitigate the impacts of activities that are threats to the species and its habitat (steps 18 and 20).
22. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all reasonable alternatives to the activities that are threats to the species and its habitat (steps 18 and 20).
23. Using input from all DFO sectors and other sources as appropriate, develop an inventory of activities that could increase the productivity or survivorship parameters (steps 3 and 17).
24. Estimate, to the extent possible, the reduction in mortality rate expected by each of the mitigation measures in step 21 or alternatives in step 22 and the increase in productivity or survivorship associated with each measure in step 23.
25. Project expected population trajectory (and uncertainties) over three generations (or other biologically reasonable time), and to the time of reaching recovery targets when recovery is feasible; given mortality rates and productivities associated with specific scenarios identified for exploration (as above). Include scenarios which provide as high a probability of survivorship and recovery as possible for biologically realistic parameter values.
26. Recommend parameter values for population productivity and starting mortality rates, and where necessary, specialized features of population models that would be required to allow exploration of additional scenarios as part of the assessment of economic, social, and cultural impacts of listing the species.

Allowable Harm Assessment

27. Evaluate maximum human-induced mortality which the species can sustain and not jeopardize survival or recovery of the species.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Document

Participation

Fisheries and Oceans Canada (DFO) (Science, Ecosystems and Fisheries Management, Policy and Economics sectors, Habitat and Species at Risk programs)

- Ministry of Natural Resources of Ontario
- Conservation Authorities
- Academics
- Other invited experts

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APPENDIX 2. PARTICIPANTS

Threehorn Wartyback Recovery Potential Assessment

December 10, 2013

WebEx and Conference Call

Last name	Affiliation
David Balint	Fisheries and Oceans Canada, Species at Risk
Lynn Bouvier	Fisheries and Oceans Canada, Science
Kelly McNichols-O'Rourke	Fisheries and Oceans Canada, Science
Todd Morris	Fisheries and Oceans Canada, Science
Shawn Staton	Fisheries and Oceans Canada, Species at Risk
Jen Young	Fisheries and Oceans Canada, Science